

Appl. No. 10/805,956

Amdt. Dated January 11, 2005

Reply to Office action of October 21, 2004

Amendments to the Claims:

1-15. Cancelled

16. (Currently Amended) An apparatus to control displacement of a body spaced-apart from a surface, said apparatus comprising:

a flexure system having first ~~flexure~~ and second flexure members coupled together, said flexure system having a plurality of joints spaced-apart from a pivot point;

a body coupled to said flexure system to move with respect to a plurality of axes defined by said flexure system; and

an actuation system coupled to said flexure system ~~with said body being coupled to said flexure system to move with respect to a plurality of axes with said actuation system being configured to cause movement of said flexure system, with said flexure system selectively constrain~~ constraining movement of said body along a subset of said plurality of axes, said subset including a first axis extending orthogonal to a second axis, with said pivot point being defined by an intersection of said first axis and said second axis.

17. (Currently Amended) The apparatus as recited in claim 16 wherein said actuation system ~~provides~~ and said flexure system provide resistance to movement of said body with respect to said subset, while allowing relatively free movement with respect to axes outside of said subset.

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18. (Original) The apparatus as recited in claim 16 wherein said subset is coplanar with said body.

19. (Original) The apparatus as recited in claim 16 wherein said subset of axes includes two orthogonal axes.

20. (Currently Amended) The apparatus as recited in claim 16 wherein said actuation system ~~provides~~ and said flexure system provide resistance to translational displacement of said body with respect to ~~a subgroup of~~ said subset ~~of axes~~, while allowing relatively free translational displacement with respect to axes outside of said subset, and resistance to rotational displacement of said body with respect to ~~a sub-portion of said subgroup of~~ said plurality of axes, while allowing relatively free rotational displacement of said body with respect to axes outside of said ~~sub-portion~~ subgroup.

21. (Original) The apparatus as recited in claim 20 wherein said subset of axes includes two substantially orthogonal axes and said subgroup includes an additional axis extending substantially orthogonally to said two orthogonal axes.

22. (Original) The apparatus as recited in claim 20 wherein said subgroup extends normal to a surface of said body.

23. (Currently Amended) The apparatus as recited in claim 16 wherein said first and second flexure members each

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includes a [[mount]] frame, a pair of spaced-apart braces, a first flexure arm pivotally connected between said [[mount]] frame and one of said pair of spaced-apart braces, and a second flexure arm pivotally connected between said [[mount]] frame and one of said pair of spaced-apart braces disposed opposite to said first flexure arm.

24. (Original) The apparatus as recited in claim 16 further including a flexure ring, a base plate and a force sensor connected between said flexure ring and said base plate with said flexure system being connected to said flexure ring.

25. (Original) The apparatus as recited in claim 24 wherein said actuation system further includes a plurality of actuators to control displacement of said body.

26. (Currently Amended) The apparatus as recited in claim 16 wherein ~~said first and second flexure members are coupled together to define a flexure system having said~~ plurality of joints comprises eight joints with said joints being spaced apart from a pivot point defined by the intersection of said first axis and said second axis.

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27. (Currently Amended) An apparatus to control displacement of a body spaced-apart from a surface, said apparatus comprising:

a flexure system having first and second flexure members coupled together, said flexure system having a plurality of joints spaced-apart from a pivot point;

a body coupled to said flexure system to move with respect to a plurality of axes defined by said flexure system; and

~~an actuation system coupled to,~~ with said flexure system ~~with said body being coupled to said flexure system to move with respect to a plurality of axes with said actuation system being configured being coupled thereto to cause movement of said body while selectively constrain~~ constraining translational displacement, of said body, with respect to a subset of said plurality of axes and to ~~constrain~~ constraining rotational displacement, of said body, with respect to a subgroup of said plurality of axes, said subset including a first axis extending orthogonal to a second axis, with said pivot point being defined by an intersection of said first axis and said second axis.

28. (Original) The apparatus as recited in claim 27 wherein each of the axes associated with said subset differs from each of the axes associated with said subgroup.

29. (Currently Amended) The apparatus as recited in claim 27 wherein said actuation system provides and said flexure system further provide resistance to translational displacement of said body with respect to said subset,

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while allowing relatively free translational displacement with respect to axes outside of said subset, and resistance to rotational displacement of said body with respect to a ~~sub-portion of~~ said subgroup, while allowing relatively free rotational displacement of said body with respect to axes outside of said ~~sub-portion~~ subgroup.

30. (Original) The apparatus as recited in claim 27 wherein the axes of said subset are coplanar with said body.

31. (Original) The apparatus as recited in claim 27 wherein said subset of axes includes two substantially orthogonal axes.

32. (Original) The apparatus as recited in claim 27 wherein said subset of axes includes two substantially orthogonal axes and said subgroup includes an additional axis extending substantially orthogonally to said two substantially orthogonal axes.

33. (Original) The apparatus as recited in claim 32 wherein said subgroup extends normal to a surface of said body.

34. (Currently Amended) The apparatus as recited in claim 27 wherein said flexure system further includes first and second flexure members each having a [[mount]] frame, a pair of spaced-apart braces, a first flexure arm pivotally connected between said [[mount]] frame and one of said pair of spaced-apart braces, and a second flexure arm pivotally

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connected between said [[mount]] frame and one of said pair of spaced-apart braces disposed opposite to said first flexure arm.

35. (Original) The apparatus as recited in claim 27 further including a flexure ring, a base plate and a force sensor connected between said flexure ring and said base plate with said first and second flexure members being connected to said flexure ring.

36. (Original) The apparatus as recited in claim 35 wherein said actuation system further includes a plurality of actuators connected to said base plate.

37. (Currently Amended) An apparatus to control displacement of a body spaced-apart from a surface, said apparatus comprising:

a flexure system having first and second flexure members with said first and second flexure members each including a [[mount]] frame, a pair of spaced-apart braces, a first flexure arm pivotally connected between said [[mount]] frame and one of said pair of spaced-apart braces, and a second flexure arm pivotally connected between said [[mount]] frame and one of said pair of spaced-apart braces disposed opposite to said first flexure arm;

a body coupled to said flexure system to move with respect to a plurality of axes defined by said flexure system; and

an actuation system coupled to said flexure system  
~~with said body being coupled to said flexure system to move~~

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~~about a plurality of axes with said actuation system being~~  
~~configured to cause movement of said body, with said~~  
~~flexure system selectively constrain~~ constraining both  
translational displacement, of said body, with respect to a  
subset of said plurality of axes, and ~~to constrain~~  
rotational displacement, of said body, with respect to a  
subgroup of said plurality of axes with said subset of axes  
including two substantially orthogonal axes and said  
subgroup including an additional axis extending  
substantially orthogonally to said two substantially  
orthogonal axes.

38. (Currently Amended) The apparatus as recited in  
claim 37 wherein said actuation system ~~provides~~ and said  
flexure system provide resistance to translational  
displacement of said body with respect to said subset,  
while allowing relatively free translational displacement  
with respect to axes outside of said subset, and resistance  
to rotational displacement of said body with respect to a  
~~sub-portion of~~ said subgroup, while allowing relatively  
free rotational displacement of said body with respect to  
axes outside of said ~~sub-portion~~ subgroup.

39. (Original) The apparatus as recited in claim  
37 wherein the axes of said subset are coplanar with said  
body.

40. (Original) The apparatus as recited in claim  
37 wherein the axes associated with said subgroup extend  
normal to a surface of said body.

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